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ABSTRACT

Teaching skills can be acquired or modified through various processes, including observation, concept acquisition, practice, and feedback. However, evidence does not indicate that combining these processes into a single training methodology provides any advantage for teacher trainees. Teaching also may be influenced by providing information about teaching skills, inducing cognitive conflict, and arranging for selective reinforcement. Although teaching skills may have been acquired or modified, their use cannot be assumed. The complexity of a skill, its acceptance philosophically, its utility in terms of student learning, and the supervisory support that it receives all influence the extent to which a teaching skill is adopted and used. To extend and refine the knowledge about these processes will require a refining of criteria to include both qualitative standards and more complex definitions of teaching skills. (Author/JD)

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Learning How to Teach

PROCESSES EFFECTS & CRITERIA

by David H. Gliessman

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LEARNING HOW TO TEACH:
PROCESSES, EFFECTS, AND CRITERIA

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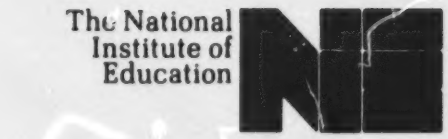

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FOREWORD

Learning How to Teach: Processes, Effects, and Criteria speaks primarily to teacher educators who are responsible for designing and conducting preservice teacher education programs, and also to those professionals who carry responsibility for inservice education of teachers. Other professionals concerned with educational personnel development may also find it valuable.

The author skillfully analyzes the processes that can be used to assist prospective or practicing teachers to acquire or modify their teaching skills. He cautions, however, that the retention and use of new skills cannot be assumed. He encourages new approaches to the development of teaching skills, and attempts to clarify what investigators must take into account to enrich educational research.

The Clearinghouse is indebted to David H. Gliessman for this contribution to educational literature. Dr. Gliessman is director of the Center for Development in Teacher Education at Indiana University in Bloomington. Acknowledgment is due also to the Clearinghouse editor, Sharon G. Boardman, for her diligent work in seeing the manuscript through to publication.

KARL MASSANARI
Director, ERIC Clearinghouse
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PREFACE

In writing this monograph, my first purpose is to describe what we as teacher educators know--as well as the limits of what we don't know--about acquiring teaching skills. For some time, it has been my impression that teacher educators may be both unnecessarily restricted in their conceptions of how to improve teaching performance, and unnecessarily lacking in confidence that teaching performance can be improved.

In completing a recent review of the teacher training literature, I became aware that we have far greater resources to bring to bear on the improvement of teaching than is often assumed. At the same time, it is clear that the research on ways of acquiring teaching skills has not been as productive as it might have been. Investigators have tended to address a limited number of teaching skills that have been relatively easy to assess, but that have not reflected the most complex aspects of teaching. Thus, we know less than we should about acquiring more complex teaching skills. My second purpose in these pages is to suggest some steps to help correct this imbalance in the research.

A few words about the nature of the literature on which I have drawn should lend perspective to the discussion that follows. That literature has consisted of studies of both preservice and inservice teacher training and of ways of effecting change in teacher behavior. These studies were conducted sometimes in laboratory settings (for example, microteaching) and sometimes in classroom settings. In a large proportion of studies, instructional or training methods were used to develop teaching skills or to produce changes in teaching performance (for example, through training films or simulated practice). In a smaller proportion of studies, some kind of intervention (for example, videotape recordings of a teacher's performance) was arranged to influence performance in the natural classroom setting.

Despite these variations in setting and procedure, a common theme characterizes these empirical studies: In each, a teaching skill was specified, an attempt was made to develop or influence that skill, and the results of such training or intervention were evaluated objectively. The ultimate question was always, "Can or does the teacher exhibit the skill after training or after a planned intervention?" Changes in teacher expectation, self-concept, attitudes, and knowledge, although unquestionably

important from other points of view, have not been considered in the studies this author has researched.

In describing ways of acquiring or modifying teaching skills, I have chosen to speak of "processes of learning how to teach" rather than, for example, methods of training or instructional techniques. There are two reasons for this choice of terminology. First, to speak of processes of acquiring or changing teaching skills is sufficiently broad terminology to cover the varied approaches to that task. As will be seen in the discussion that follows, teaching skills can be developed or modified through methods that are markedly different from training in the usual sense of that term or from conventional instruction. Skills can be modified, for example, through observation or reinforcement. Viewing the task of acquiring or modifying skills as a process of learning those skills encompasses the latter two approaches as well as the use of training or instruction. Second, speaking of processes of learning rather than methods of training places the motive and locus of change directly upon the learner, whether that learner is a teacher trainee or an experienced teacher. In professional development, that should be the case. The place of the teacher educator, the supervising teacher, or the inservice instructor, on the other hand, is to understand and deliberately arrange for these processes.

It is my hope that the present monograph will both encourage new approaches to developing teaching skills in teacher education programs, and clarify what investigators must take into account to enrich the research on teacher training in the future.

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LEARNING HOW TO TEACH: PROCESSES, EFFECTS, AND CRITERIA

In this monograph, learning how to teach refers to acquiring presentation, discussion, management, supportive, and other kinds of skills that are a necessary part of classroom instruction. Teaching itself, of course, is much broader, involving selection and planning of content, evaluation, advisement, and even administration, but in the final analysis, teachers must perform; it is performance with which the monograph is concerned.

Two reasons support such a focus. First, classroom instruction remains by far the most common mode of teaching, and accumulating evidence shows that how a teacher conducts classroom instruction does influence pupil achievement. For example, a teacher's skills in managing classroom behavior and in using direct instruction influence student achievement at the elementary level (Good 1979). Second, a substantial part of the systematically gathered evidence on the effectiveness of different training methods in teacher education has focused on the acquisition of classroom instructional skills. That evidence both provides the basis for and sets limits on empirical knowledge about teacher training. However, with care one can generalize to instructional skills and practices that are similar in form if not in content to the skills typically addressed in studies of teacher training. Although, as we shall see, the skills are not generally identical to the skills emphasized in studies of teaching effectiveness, their forms are similar in that both tend to be interactive. Thus, the learning processes considered in this monograph can be expected to apply a general set of interactive classroom skills.

Traditionally, learning how to teach in this sense has been assumed to occur through practicums, internships, student teaching, and similar practical experiences, even though evidence of their effects on teaching performance is decidedly limited (Elliott 1978; Zeichner 1978). It would be naive to contend that experience is unnecessary, as experience is necessary at least to try out the skills one has acquired and at most to refine one's total performance as a teacher. However, to learn how to teach from experience alone is far too uncertain; no evidence suggests that experience alone improves teaching, and some evidence suggests that it does not (Clark, Snow, and Shavelson 1975; Gage and Berliner 1979).

Ample evidence, on the other hand, shows that teaching skills can be learned and teaching performance modified through

methods that provide for control and guidance of experience. For example, microteaching, which is a way of controlling experience by simplifying it; protocol films and videotaped replays, which make it possible to focus on specific aspects of experience; and minicourses, which provide for both focus and control, are among the methods that are known to influence teaching performance. Although the specific methods and materials that have been successfully used are extremely varied, however, they appear to depend for their effectiveness on a few training or instructional elements (Gliessman 1980).

The first task of this monograph is to identify these training elements and describe the learning processes they imply. At the same time, evidence of the effects of these processes on teaching performance will be described or summarized. Several advantages accompany a summary analysis of this kind. First, it should provide a helpful perspective on the numerous training procedures and materials that have been effectively used with preservice and inservice teachers. Such a perspective should be of assistance in the designs of both training and training materials. Second, the analysis may help researchers identify questions about the acquisition of teaching skills on which evidence is most needed. Third, this analysis should suggest that there are different processes through which one can learn how to teach or how to improve one's teaching. It is obvious that these processes are not really separable, because in learning how to teach, as in learning how to do anything, a learner acts in an integrated way. However, each process suggests a different focus, a different point of departure and emphasis, in acquiring teaching skills. What can be gained by combining the processes in a training sequence is a question for later in this monograph.

Inevitably, what we know about learning how to teach is limited. Evidence of the effects of training typically has been sought in the occurrence or incidence of one or more relatively simple skills. Few studies have used qualitative criteria or emphasized complex skills (three studies that have done so are reported by Good and Brophy 1974; Moore, Schaut, and Fritzges 1978; Perlberg and Bar-On 1980). Thus, while the processes to be described appear to be as applicable to the acquisition of complex skills as they are to the acquisition of simple skills, most of the evidence pertains to the latter. The second task of this monograph is to call attention to the problem of criteria, although the problem is not discussed with the thoroughness it deserves and only a few of its dimensions are noted.

Finally, by way of clarification, it should be emphasized that the following processes are as concerned with the improvement of teaching as they are with the acquisition of teaching skills. Empirical studies in teacher training have been conducted about as often with experienced as with inexperienced teachers and with equally positive effects. This writer views learning how to teach as a continuous task; that one never perfects it is a primary challenge of teaching.

Processes in Learning How to Teach

From the point of view of a learner or trainee, the processes to be described are ways of developing, modifying, or refining teaching performance. Even those processes that are primarily observational or conceptual should be closely connected to ongoing teaching performance. In the pages that follow, the writer occasionally uses the phrase "acquire a teaching skill" to describe one way in which these processes can influence teaching performance: establishing a teaching behavior that may not have been exhibited previously. As this paper postulates, teaching behaviors or skills (the latter term refers to a specific teaching behavior that is used deliberately to achieve a specified instructional outcome) can be acquired perceptually as well as through overt performance. The test of skill acquisition, however, is always the trainee or learner's ability to exhibit the skill itself.

In studies of teacher training, performance is arranged in the laboratory and in the classroom about equally often. This distinction is important to some critics who view the former as less realistic and demanding. However, this writer believes, on the basis of experience in training veteran teachers, that teaching in either setting is sufficiently complex to test one's ability to perform. Both settings provide valid information to the trainer or investigator on the effects of training. The problem comes in applying skills acquired in a laboratory setting to the classroom; this significant problem will be discussed later.

Learning Through Observation

The adage, "We teach as we were taught," contains a large kernel of truth. Human beings clearly have the capacity for learning from observing others. Evidence shows that people acquire complex social and emotional behaviors on the basis of "modeling" or imitation (Bandura and Walters 1963); other evidence shows that people can acquire general patterns of physical skill from watching skilled performers (Travers 1973). These few examples illustrate that different forms of behaviors are acquired or modified through observational learning.

In the case of teaching, effects of observational learning are reflected in the influence of a cooperating teacher on the attitudes and behaviors of a student teacher, a well-documented phenomenon (Smith 1977; Zeichner 1978). Smith cited evidence that student teachers become less open in their attitudes when they work with cooperating teachers who are themselves low in openness. It is improbable that such changes in attitude result from direct instruction; more likely the influence is conveyed through the modeling effect of the critic teacher's behavior. In addition to the attitudes, behaviors of student teachers also are influenced by modeling. In a study of classroom application of skills acquired through microteaching, Copeland (1977) found that

a questioning skill was more likely to be used by a student teacher when that student's critic teacher modeled the questioning skill in his or her own behavior.

Both good and bad effects were present in these studies in the sense that cooperating teachers can and do model behaviors that, professionally speaking, are both desirable and undesirable. The apprentice relationship of a student teacher to a cooperating teacher, in turn, may increase the likelihood that attitudes and behaviors will be imitated irrespective of their professional value. Thus, it is unwise for the teacher educator to depend on observational learning that occurs in unselected classroom experiences to obtain results that are wanted.

To achieve some control over what is learned observationally, teacher educators must begin by gaining control over the models or examples that are observed. An efficient way to increase control over a learning experience is through the use of film or videotape. Substantial evidence in human learning affirms that quite complex social behaviors can be acquired through filmed models (Bandura 1965). The same ought to be true of teaching behaviors or skills, and limited evidence supports that expectation.

It is common practice to incorporate models or examples, generally portrayed on film or videotape, to teacher training materials and procedures. A familiar example is the "model film" in a minicourse showing the skills to be acquired through later practice (Borg et al. 1970). Studies of training based on the minicourse and similar methods regularly report changes in teaching performance (Gliessman 1980). It is reasonable to assume that, in these studies, observational learning combined with practice to contribute to that change in performance. Both indirect and direct evidence supports this assumption. It has been found that the medium--film, audiotape, print--used to present a model or example affects skill acquisition (Turney et al. 1973). Although evidence tends to support the use of filmed or videotaped models, that evidence is inconsistent; different media may be more appropriate for different kinds of skills or stages of training. Regardless of the inconsistency, the fact remains that the effects of training have tended to differ when models or examples are presented through media. This fact suggests that models or examples are important parts of training.

Along with such indirect evidence, at least one study directly supports the assumption that observational learning contributed to change in teaching performance. Koran, Snow, and McDonald (1971) found that without the use of filmed or printed models, laboratory practice failed to produce change in a questioning skill in a group of teaching interns.

The most critical test of observational effects on teaching performance is to exclude practice as part of training and to use models or examples alone as the medium of instruction. For example, Lange (1971) showed that a brief film of a teacher modeling an indirect or student-centered teaching style influenced the performance of a group of preservice teachers toward greater use of an indirect style. This result is of

interest because a highly efficient, simplified training method achieved change in an aspect of teaching that customarily has been attacked through extended practice (Bondi 1970) or through learning to use a highly complex, observation category system (Flanders 1970).

To explain the results of Lange's study, it is necessary to consider more carefully the concept of indirect influence as Flanders defined it and Lange adopted it. According to Flanders, indirect influence is reflected in four teaching behaviors: accepting feelings, giving praise or encouragement, accepting or using student ideas, and asking questions. At least two of these behaviors--giving praise and asking questions--are common human social behaviors (whatever may be their status in teaching), while the remaining two probably contain elements of more common teaching behaviors. Thus, in imitating either the general style or the specific behaviors shown by a model teacher, the trainees in Lange's study may have been using and putting together previously learned social behaviors. When complex social and emotional behaviors are acquired through modeling, it is generally assumed that the component behaviors already have been learned (Bandura and Walters 1963).

Observational learning may be particularly appropriate for the emotive, expressive aspects of teaching behavior that are difficult to convey through language. For example, although the characteristic of teacher "enthusiasm" may be developed through guided practice (Collins 1978), it and other expressive characteristics such as teacher warmth may be as effectively and more directly influenced by the viewing of carefully selected models or examples. With the many teaching skills that are primarily verbal and conceptual, however, there are substantial reasons to emphasize conceptual rather than observational learning as an outcome of instruction (Gliessman, Pugh, and Bielat 1979b).

Concept Learning

Models and examples can affect teaching performance indirectly through their role in acquiring concepts as well as directly through observational learning. The term "concept" is used here in the sense of a category of like or similar behaviors that can be distinguished from other categories of behavior. For example, the concept of "teacher approval" typically is used to refer to the varied teacher statements, gestures, and expressions that convey satisfaction with or acceptance of what a pupil has done or said. Approval can be distinguished as a concept from "disapproval," which implies dissatisfaction or rejection. Similarly, the concept of "convergent question" can be distinguished from the concept of "divergent question" in that the former produces a predictable response; this general characteristic is a distinguishing feature of convergent questions that themselves may vary widely in form and content.

Viewing a teaching skill as a concept to be acquired implies

that the immediate goal of instruction is conceptual: To be learned are the essential characteristics of a skill, its specific uses in teaching, and how it is distinguishable from other skills. Mastery of a concept may be tested by the ability to correctly identify new examples of a skill in a filmed or videotaped protocol, to construct new examples, or to apply the concept in the interpretation of teaching situations. With respect to the means of learning concepts, evidence illustrates that a clear, complete definition of a skill and a variety of examples both contribute to mastery of a concept (Gliessman and Pugh 1978); this finding is consistent with more general evidence on concept learning (Anderson and Kulhavy 1972; Clark 1971).

The emphasis on concept mastery in the preceding paragraph is deliberate and reflects an assumption that having a clear understanding of a teaching skill and its uses increases the likelihood that it will be remembered and used in appropriate teaching situations. A vague or uncertain grasp of a skill, on the other hand, makes it less likely that the skill will be sufficiently salient for the teacher to easily recall and use. This reasoning is based on the proposition that one of the uses of a concept is to recall the solution to a recognizable problem that can then be acted upon (Ausubel, Novak and Hanesian 1978).

Conceptual as well as observational effects on practice are almost certainly reflected in those teacher training materials and methods referred to in the previous section that utilize models or examples. The clearest evidence of the effect of concept learning on performance, however, should be in those studies that once again do not incorporate practice as part of training. Several studies have used such a concept learning focus with significant effects on skill acquisition (Gliessman, Pugh, and Bielat 1979a; Kleucker 1974; Wagner 1973); a closer look at two of these studies should clarify the evidence.

In Wagner's study, preservice teachers who learned through media-based examples to differentiate the concepts of student-centered and teacher-centered teaching were better able to exhibit student centered skills than were either an untrained group or a group that received conventional microteaching training. Partial verification that the concepts had been learned was obtained through a measure of concept acquisition: Categorizing instances of teacher behavior in terms of student-centered and teacher-centered styles. The group members who were conceptually trained were not provided the opportunity to practice student-centered skills before being called on to perform them. Wagner interpreted the results of his study as indicating not only that concept-based training is sufficient to induce change in teaching behavior, but also that when such training is conjoined with practice (as is often the case in microteaching), it is conceptual learning alone that accounts for change in performance.

A study by Gliessman, Pugh, and Bielat (1979a) provides further evidence of the effectiveness of concept-based training. In this study, a group of 20 experienced teachers were divided into instructional and noninstructional groups. Instruction

consisted of analyzing protocol films illustrating two discussion skills, "probing" and "informing." The criterion for measuring acquisition was accuracy in identifying instances of these skills portrayed on a filmed "test protocol." The trained group was not provided practice in using the skills themselves. After completion of training, all teachers were administered the test of concept acquisition; as predicted, the trained group achieved a significantly higher mean score. Approximately a week later, all teachers were asked to teach a topic to groups of undergraduate students. The teachers in the trained group exhibited the skills of probing and informing with a significantly higher mean frequency. Thus, conceptual instruction alone resulted in both higher mean concept acquisition scores and higher mean frequencies of use of the skills themselves.

Both studies yielded evidence of significant gains in concept acquisition scores as well as in frequency of using the referent skills. The same results are reported in Kleucker's study. The evidence is consistent with and tends to support the hypothesis that concept learning is important in the acquisition of teaching skills. However, a more direct test of that hypothesis would seek evidence that the level of concept acquisition among trainees was positively correlated with the frequency of using the relevant skills. In the study conducted by the author and his co-investigators, a positive and significant correlation was found between relative accuracy in identifying instances of probing and informing and frequency of using those skills.

The results of a second study partially supported the earlier findings. A group of 30 experienced teachers learned through filmed examples to identify the skill of probing as one of a set of discussion skills. As part of another unit in the course, they were required to teach a substantive topic to small groups of undergraduate students. Frequency of using the skill of probing was assessed from audiotapes of the teaching sessions. The group was divided at the median level in frequency of probing and the two subgroups were compared on several indices of concept acquisition. Although they did not differ significantly in two simpler concept acquisition tasks, they did differ significantly in their abilities to apply to their teaching the concept of probing interpretivelyg--in terms of Bloom's taxonomy, the highest level conceptual task required (Gliessman, Pugh, and Bielat 1979b).

The evidence described in the preceding paragraphs has shown (a) that conceptual learning in the absence of practice influences teaching performance; (b) that concept acquisition scores increase along with increased use of the skills to which they refer; and (c) a positive relationship between level of concept acquisition and frequency of using the referent skills. Although the evidence tends to support the hypothesis that knowledge and understanding of concepts leads to increased use of the teaching skills to which the concepts refer, the value of practice is clearly called into question.

Learning Through Practice

The term "practice" has several definitions, but used here, it refers to performing under controlled conditions with the intention of improving one's performance. This meaning is decidedly different from practice in the sense of general experience or practice teaching. The essential conditions for practice are established when a "target" skill is specified, content and conditions are arranged for using it, and the complexity of the teaching setting is controlled. Although this may be accomplished in the classroom, it is more likely to be achieved in a laboratory setting. In teacher training, microteaching is a generally familiar example of learning through practice. In microteaching, a target teaching skill or set of skills is specified; appropriate content is planned for using that skill or set of skills; degrees of control are achieved through limiting the numbers of students (five or six are usually used), the total teaching time (five to ten minutes is common), and the content to be taught (a single topic is usually selected); and finally, a second practice session or "reteach" is arranged (Olivero 1970).

Before the first practice session, students are usually provided an overview that typically includes filmed models and examples. Sound instructional reasons can be cited for including the overview component, as well as for videotaped, audiotaped, or verbal feedback that usually follows practice (Hudgins 1974). Although the training sequence of (a) overview followed by (b) practice followed by (c) feedback is considered to be sound training procedure, it presents some problems in interpretation of results, because it is difficult to separate the effect of practice both from the effects of conceptual and observational learning provided by the examples or models on the one hand, and from the effects of feedback on the other. Some investigators, most notably MacLeod and McIntyre (1977) and Wagner (1973), contend that conceptual learning accounts for the improvement of teaching skills through practice, but other writers undoubtedly pose the same argument for the use of feedback. The fact is that the data are too limited to make confident statements about the effect of practice by itself on performance (Fuller and Manning 1973).

An attempt to isolate the effect of practice, however, may not be highly useful. First, the logic reflected in the three-part training sequence is compelling enough that using practice as a sole means of learning seems unnecessarily limiting. Second, ample evidence shows that training on the basis of this sequence results in changes in teaching performance (Gliessman 1980). Third, this evidence is consistent with a large body of empirical research on the acquisition of complex skills--physical, perceptual, conceptual--that verifies the effect of focused or guided practice in skill development (Hudgins 1974). Although the analogy between teaching skills and such skills as gymnastics, target shooting, and problem solving can be easily overdrawn, the daily evidence that skills are

acquired and modified through practice is sufficiently abundant to expect the same to be true of teaching skills.

Some teacher educators have been legitimately concerned that the skills acquired through practice in a laboratory setting are not applied by the learner in an actual classroom, and some empirical evidence justifies their concern. Peterson (1973) called for a reexamination of the place of laboratory practice, specifically microteaching, after failing to find expected differential training effects in the classroom. In a better designed study, Copeland (1975) failed to detect in the elementary classroom changes in a questioning skill of preservice teachers that had clearly been evident after laboratory training.

The evidence from both studies suggests that the problem of "applicational transfer" can be overcome. In a later study, Copeland (1977) demonstrated that the mean frequency with which student teachers used a practice teaching skill in the classroom was influenced by indirect or direct intervention by a critic teacher. In this study, a critic teacher's modeling of a newly acquired skill or apparent provision of effective supervision was related to the frequency with which that teaching skill was used by student teachers. It may also be that the skills selected for training are related to the likelihood of transfer to the classroom. Mohlman, Coladarci, and Gage (1980) recently reported that practices are more likely to be adopted by practicing teachers if, among other things, the practices are acceptable philosophically and they hold the promise of payoff in terms of student learning. Hence, not surprisingly, both the practices of supervisors and the selection of skills to be acquired appear to influence the extent to which those skills are applied in a classroom.

Learning From Feedback

"Feedback" refers to information gained by a performer about use of a process and its effects. In the teaching process, the information gained may include a teacher's use of questioning skills, clarity in explaining, or physical movement in the classroom as well as the effects of these skills and behaviors on pupils. Evidence reveals that when a teacher is provided such information, it can and does influence teaching performance.

As noted in the section on practice, feedback commonly is provided as part of practice. The use of practice with feedback has resulted in the acquisition of both simple skills, such as the use of approval (Kleucker 1974), and also complex skills, such as using an instructional strategy that is balanced in its demands on higher and lower order thought processes and on teacher and student participation (Perlberg and Bar-On 1980). In studies such as these, the influence of feedback alone, like practice, is difficult to isolate because feedback is conducted so frequently in conjunction with practice. However, indirect evidence supports the importance of feedback.

In studies that have directly compared the influence of

different feedback media (for example, videotape replay, audiotape replay, and verbal report) on skill acquisition (Turney et al. 1973), the medium used for feedback frequently has made a difference in skill acquisition. On the basis of that evidence, the recommendation of most investigators seems to favor videotape replay, audiotape replay, and verbal report in decreasing order of preference. Although it is difficult to generalize from these studies because the evidence is inconsistent (for example, the effectiveness of a specific medium may depend on the specific skill that is to be acquired), the fact that the feedback medium frequently made a difference suggests that feedback contributes significantly to skill acquisition through practice.

When feedback is provided on the classroom performance of teachers, its influence on teaching performance is quite clear. Gaining information on their own classroom performance has been found to significantly affect teachers in various aspects of teaching: the use of indirect influence (Bondi 1970; Leonard, Gies, and Paden 1971); varying the level of questions asked according to pupil responses (Moore, Schaut, and Fritzges 1978); and style of body posture (Dawson, Dawson, and Forness 1975). In these and similar cases, information gained by teachers on their performance has influenced that performance.

Good and Brophy (1974) provide especially clear evidence on the effect of feedback. In their study, practicing teachers were given objective information to influence their interaction with two groups of first grade pupils, those who seldom volunteered answers to questions or initiated interaction (low participants), and those who were seldom given the opportunity to respond a second time when their first was unsuccessful (low extensions). The teachers were given a list of pupils by name in these two categories and a list of contrasting pupils (that is, those who were high participants and those who were given greater opportunity for second responses). The teachers were encouraged to invite greater participation and to provide more second chances for pupils in the low groups, and they were given a rationale for these actions. As a result of the intervention, the teachers significantly increased their rates of prolonging their contacts with low extension pupils and of initiating contacts with low participation pupils. The results also included incidental performance changes toward greater use of praise, less criticism, and increased feedback with both groups.

A particularly interesting aspect of this study is that feedback consisted of summary information and did not depend on the use of more complex feedback media. In this study and in others (e.g., Emmer 1971), verbal report has been used successfully, as has videotape replay (Kleucker 1974), audiotape replay (Davis and Smoot 1970), and computer display (Semmel 1976). It is doubtful whether the same psychological processes are involved in gaining information through such varied means. Fuller and Manning (1973) pointed out that the learning and emotional processes involved in viewing oneself on videotape are both complex and hypothetical. Thus, when feedback is referred to it should be remembered that the term is being used in a

general, descriptive sense and does not refer to a unified process. In providing feedback through any medium, however, that feedback must focus the teacher's attention on some aspect of his or her teaching performance. Without such focus, the effect of feedback is likely to be distractive and diffuse, two qualities that appear to characterize many teachers' first reaction to seeing themselves on videotape (Fuller and Manning 1973). That a high degree of focus is something to be achieved rather than assumed is evident in a study reported by Diamond (1978). She found that the content of supervisor-trainee conferences analyzing videotape replays was vague, lacking in focus, and restricted in the range of behaviors considered.

Other considerations are important in the use of feedback, among them the amount and nature of supervision and the immediacy with which feedback is provided. Because feedback has been a much studied phenomenon, considerable evidence has been reported concerning these and similar dimensions (see Turney et al. 1973). As these considerations fall outside the boundaries of this monograph, it is sufficient here to emphasize again that gaining information from feedback can stimulate change in teaching performance.

Alternative Processes

The four processes that have been discussed do not exhaust those that are useful in learning how to teach. In this section, three somewhat more speculative processes are considered. These differ markedly in the sources from which they are derived and in the extent of their supporting evidence. The first alternative process depends on learning about effective teaching skills or practices; it has recently generated some interesting evidence on "directed teacher change" (e.g., Needels 1980). Originating from the highly practical problem of inducing classroom teachers to adopt and use recommended practices, this informational approach already has yielded a significant amount of empirical data. The second and third processes reflect the application of psychological and behavioral theory to the modification and development of teaching skills. However, direct evidence of their effectiveness in changing teaching performance is decidedly more limited.

Learning Through Information. In a series of recent studies, several investigators have explored the effectiveness of an informational approach to influence teaching performance, that is, recommending specific practices to teachers along with research evidence supporting the practices (Mohlman, Coladarci, and Gage 1980; Needels 1980). These recommendations to adopt certain practices or skills (asking direct questions and giving praise or support are examples) have been incorporated in a training manual circulated by mail or presented and discussed as part of a training seminar or series of seminars. Evidence from these studies indicates an increase in use of the recommended

practices, although not by all teachers, nor for all practices. Rather consistently, the simplest and most easily comprehended practices tended to be adopted by the classroom teachers; more complex practices tended not to be adopted. This differential was attributed in part to the greater clarity and specificity with which simpler skills could be described, which suggests some limitations to an approach based on verbal communication. Complex skills and practices probably are difficult to convey without some kind of visual illustrations or examples. It seems probable, too, that learning processes other than informational processes were important to the success of these studies. The use of rather systematic feedback to the teachers on their classroom performance, for example, was a significant part of the training procedure described by Needels (1980).

Change Through Cognitive Conflict. In an interesting application of psychological theory, Tuckman, McCall, and Hyman (1969) attempted to modify the self-perceptions and the performance of teachers by inducing conflict or dissonance between what teachers perceived themselves to be doing and what observational information showed them to be doing. Briefly, cognitive dissonance theory posits that conflict or disparity in a person's perceptions or beliefs, or between perceptions and behavior, produces discomfort; this discomfort can motivate the individual to change perceptions or behaviors to reduce the disparity. The investigators chose direct or indirect teaching behaviors and the related categories of "teacher talk" and "student talk" (Flanders 1970) for the variables of teaching on which data were obtained. Experienced teachers rated their own teaching, and then were provided observational data on the actual occurrence of their teaching behaviors in the various categories. Faced with a discrepancy between perceived and actual behaviors, the teachers displayed both perceptual and behavioral changes toward reducing the disparity between their behavior as perceived and as actually exhibited. The provision of verbal feedback itself resulted in significant change in certain aspects of teaching behavior, while the initial size of the discrepancy between perception and behavior affected changes in perception (the greater the initial discrepancy, the greater the change in the way the teachers viewed their own teaching).

The methodology used in this study would be unconventional as a training methodology, because the expected changes were not directional. For example, the teachers might have become either more consistently direct or more consistently indirect in their teaching behavior. For a teacher educator committed to indirect teaching as a preferred style, the changes toward greater indirectness that occurred in the study must be viewed as fortuitous, not intentional. It might be expected, however, that an experienced teacher typically would have in place a working, well-established teaching style as well as a perception of that style. If this is true and if alternative styles are defensible, then a realistic approach to inservice training might be to reveal inconsistencies between perception and behavior. Such an

approach might result in movement toward greater coherence in teaching performance. In the case of more conventional approaches to training, where a preferred or ideal style or set of behaviors is assumed, dissonance might be created or compounded by an explicit and convincing presentation of that ideal style or behavior.

Learning Through Reinforcement. A long-standing tenet of behavior theory holds that behavior is strongly influenced by its consequences. Behaviors that result in satisfying or confirming outcomes tend to recur; those that do not tend not to recur. This is, in brief, the theoretical proposition on which a behavioral approach to acquiring or modifying teaching skills might be based (McDonald 1973). This process might begin with an analysis of a trainee's behavior (most conveniently recorded on videotape) to determine if a desired skill, such as asking evaluative questions occurs and, if so, with what frequency. If the skill occurs with reasonable frequency, further training may be unncessary, but if it occurs infrequently, a trainee should be given the opportunity to perform the skill. Any success in performance should be noted by the trainee and perhaps confirmed or approved by a supervisor. If the specific questioning skill does not occur, a trainee's general questioning skills should be analyzed and encouragement or praise offered for those questions having any evaluative content, while, for the moment, other aspects of questioning are ignored. Through such a shaping process, the skill of asking evaluative questions should be established readily. Together with the use of prompts and cues, such a behavior management process theoretically can result in significant changes in performance.

Although the processes it suggests are quite consistent and coherent theoretically, the evidence on behavioral training of teachers is neither abundant nor consistent. In their recent review of the literature on behavioral teacher training, Robinson and Swanton (1980) could identify only six studies that met their stringent requirement of demonstrating the generalization of changes in teaching behavior to classroom settings other than those in which the training had occurred. The reviewers further concluded that the research methodology was sufficiently sound in only three of those studies to make evidence of skill generalization convincing. However, the summaries of the studies suggest that the training process may be judged more effective if the less stringent, more typical criterion of changed performance during training were applied.

Effective behavioral training is both logistically difficult and time consuming because of the intensive focus required on both the skill and the individual trainee. Judging from the small numbers of trainees and the extended training times involved in the studies that Robinson and Swanson reviewed, it is likely that such an intensive effort characterized the training methods. One wonders about the efficiency of behavioral teacher training, because the kinds of skills addressed in these studies (e.g., the use of praise and direct instruction) often have been

attacked successfully through far less intensive and time-consuming methods of training. This fact leaves the impression that the unique value of learning how to teach through behavioral procedures remains untested; offhand, such procedures appear to be particularly suitable for skills that are for some reason difficult to acquire or for undesirable behaviors that are difficult to eliminate.

Combined Processes

After considering the varied alternatives, it seems reasonable to speculate about the effects of combining different processes in a training sequence. As in the cases of microteaching and the minicourse, combinations of observational, practice, and feedback components are typical, and are supported by a sound rationale. As Joyce and Weil (1980) pointed out, a fully developed "training model" approach to instruction reflects the influence of training psychology, cybernetics, behavior theory, and systems analysis. The result is a particularly powerful approach to instituting change, especially in the area of physical skills.

Little evidence suggests, however, that training on the basis of such a model provides any unusual advantage in terms of the development of teaching skills. Generally, the use of an observational or practice or feedback component alone results in equivalent gains in performance (Gliessman 1980). Three possible reasons may account for this rather surprising finding. First, the simple occurrence of skills, which is a common criterion in studies of teacher training, may be insensitive to major differences in instruction or training. Comparisons of complex processes with single processes or of different single processes may be unproductive unless more refined criteria are used to assess the effects of training. Second, sufficient attention has not always been given to refining the processes that are combined. For example, if concepts are not mastered, if feedback is not focused, and if provision is not made for repeated practice, the effect of combining such incomplete processes might well be disappointing. Third, and most likely, the effectiveness of a training model that combines different processes seems to have been demonstrated particularly for physical skills. As noted previously, physical skills are notably dissimilar to the verbal and social skills that are characteristic of teaching. Largely comprising common personal and social behaviors, teaching behavior may be influenced simply by far less complex training or instructional processes.

Still, evidence on the effects of processes combined in a training model remains important, because of the possibility that teachers differ in the opportunities they need to acquire a skill. For example, although teachers of high ability may learn quickly from a minimal amount of highly focused feedback or from a few well-chosen examples, teachers of less ability may require more of both in addition to the opportunity for extensive

practice. At present, we simply do not have the data necessary to resolve this question.

Use and Retention of Acquired Skills

Assuming that teaching skills can be learned through varied processes, the question remains, Will the skills that have been learned during teacher preparation be used in classroom teaching? Compared with the evidence on acquired teaching skills, the evidence on this question is scant, and what there is suggests that one simply cannot assume that acquired skills will be used and will persist. A better question might ask, Are there ways of increasing the likelihood that acquired skills will be applied in the classroom? The evidence on this question is more encouraging; the following generalizations from this evidence depend in part on Copeland's (1977) study of the application of skills acquired through microteaching and on the findings reported by Mohlman, Coladarci, and Gage (1980) in their study of factors influencing teachers' adoption of recommended practices.

The nature of the skills themselves is important in at least three senses--their complexity, rationale and effect on student performance. A complex set of skills which implies a major change in classroom procedure often has "built-in" obstacles to its use. An example is the "mastery teaching" strategy, which requires for many teachers a new approach to classroom instruction. Emphasis in mastery teaching is placed on setting objectives, frequent testing, and remedial teaching (Okey 1977). Although this strategy is of demonstrated effectivensss in increasing pupil learning and it can be acquired through training, evidence demonstrates that inexperienced teachers (Okey 1977) and teachers in some kinds of school settings (Van Sickle and Ehman 1975) may have difficulty putting it into practice. It is likely that school policies and practices (for example, with respect to grading and preparation time) as well as school resources must be changed to encourage the general use of such a complex set of skills.

A set of skills is more likely to be used if a teacher has a philosophical commitment to those skills. To be adopted, a new way of teaching had best be in harmony with a teacher's beliefs about the nature and goals of teaching. Although this premise seems logical enough, its extension to the present training of teachers is somewhat unsettling. Assuming that the teaching skills addressed in studies of teacher training represent what teachers are expected to learn, teachers had better beleive in asking "higher order" questions and in student-centered teaching. Questioning taxonomies (generally based on Bloom 1956) and observation systems for an indirect/direct style (generally Flanders 1970) dominate the sources from which prescribed teaching skills are derived. It is doubtful that these two conceptual systems alone represent adequately the systems of belief that teachers have about teaching. In fact, some evidence suggests that teachers do <u>not</u> value learning more ways to promote

pupil personal growth (Ingersoll 1976), a major aim of student-centered teaching. To know what teachers do value is a most important basis for identifying the skills that they are likely to use as well as acquire.

The potential effect of a teaching skill on student learning or interest appears also to be an important consideration for teachers. Mohlman and her co-investigators report that providing empirical evidence of how a teaching practice influences learning tends to facilitate adoption of that practice. Once again it must be admitted that teaching skills addressed in studies of teacher training leave a great deal to be desired with respect to this finding. The skills typically addressed in those studies tend to be similar in form to those addressed in studies of teacher effectiveness (for example, they tend to be interactive skills in both cases). It would be difficult to build a rationale in terms of student learning, however, for the specific skills addressed in training studies. Gage (1978) pointed out that the research on teacher training and the research on the effects of teacher behaviors have progressed independently of one another. In that contention, he is correct; the specific skills that teachers have been expected to acquire in training studies frequently differ from the skills and practices that have been found to correlate with student learning.

A judicious selection of skills to be learned, however, is not sufficient to assure their use in the classroom. There also must be collegial and administrative support for the use of newly acquired or modified skills. The importance of the cooperating teacher's influence on the use of skills acquired prior to practice teaching has already been noted. A major problem is to assure that teachers, colleagues, and administrators agree on the importance of using specific skills. Such agreement is best based on rational and empirical grounds, although that is probably more hope than reality.

A related problem that has been investigated even less frequently is the long-term retention of acquired skills. Teacher training studies generally have considered immediate, post-training changes in performance without attending to longer term effects. However, in what has become almost a classic study, Borg (1972) demonstrated that teachers were able to exhibit approximately half of a set of teaching skills acquired through practice-based training three years following the training period. He attributed their retention in part to overtraining (a minicourse comprising many training elements was used) and in part to the teacher's opportunity to use the skills in their daily teaching.

Although limited, the evidence on both use and retention of acquired teaching skills is encouraging. The importance of further research is clear, but the value of that research depends in part on the definition of more refined skill criteria. To do less probably would result in the kinds of qualified conclusions that currently must be drawn from research on teacher training.

Criteria of Teaching Performance

Previously in this monograph reference has been made to the limitation imposed on evidence by the general dependence on incidence or frequency of using a teaching skill as a performance criterion. Although the ability to exhibit a specified skill such as asking a higher order question or expressing approval is of consequence, it is a rudimentary kind of evidence for skill acquisition. Exhibiting even several simple skills would not appear to be a sufficiently complex task to provide a crucial test of learning. This may explain why few teacher training studies report an absence of change in teaching performance. From a practical point of view, this state of affairs leaves the trainee or teacher without a clear picture of what she is to learn to do at more than a basic level. From the viewpoint of research on learning how to teach, it restricts the empirical data that are needed to refine the processes that have been discussed earlier.

The question of what the criteria of skilled teaching performance should be, of course, is a complex one to address; its complications and implications go far beyond what can be discussed in this monograph. What we can do here is establish the location and boundaries of the problem; in other words, we can identify the aspects of classroom performance in which criteria might be ultimately sought and stated. The discussion that follows, then, is decidely exploratory, and far from definitive.

From the viewpoint of acquiring or improving teaching skills, performance criteria should be stated in terms of those variables that Dunkin and Biddle (1974) refer to as "process variables." These variables, which refer to teacher and pupil behaviors in the classroom, are influenced by such "presage variables" as teacher characteristics and experience and by such "context variables" as pupil characteristics, classroom conditions, and school setting. "Product variables," in contrast, refer to the results of classroom instruction, for example subject matter achievement, attitudes, and personal growth of pupils. Although it is plausible to argue that teaching <u>effectiveness</u> ultimately must be assessed on the basis of such product variables as pupil achievement (Borich 1977), the objectives of training cannot usefully be specified in terms of product variables alone. This is because product variables do not directly describe the classroom behavior of the teacher nor always of the pupil.

To identify criteria that are useful for training, one must instead focus on the process variable of teacher behavior. Only by doing so can one communicate to the trainee or teacher what he or she is to learn to <u>do</u> as a result of training. Teacher behavior, however, can be viewed from somewhat different perspectives--as behavior in itself and as behavior in interaction with pupil behavior. Each perspective suggests a somewhat different way of talking about performance criteria. The remainder of this section explores a few of the possibilities

and problems inherent in each of these approaches to defining criteria.

Teacher Process Criteria

It is common practice, as noted, to state the objectives and assess the effects of training in terms of teaching skills alone. Typically, in studies of teacher training, the frequency with which trainees exhibit a skill (such as asking higher order questions or expressing approval) is noted and reported. A few investigators have also identified qualitative characteristics in terms of which teaching skills might be rated. These have included the degree of learner-centeredness or personal support, and the logical consistency that characterizes a teacher's instructional behavior. Such qualitative characteristics often reflect philosophical positions on the nature of good teaching. As Dunkin and Biddle (1974) suggest, some educators hold the view that "teaching should be stimulating, democratic, or warm because of the inherent superiority of these qualities."

In general, however, teacher educators probably are better satisfied when teaching skills are emphasized in training because those skills have been found to correlate positively with pupil product variables such as academic achievement (Borich 1977; Dunkin and Biddle 1974). Borich (1979) provides an example of how teacher educators might select teaching skills on that basis to incorporate in teacher training. Synthesizing five different correlational studies, he identified a limited number of teaching "competencies" associated with pupil achievement at the elementary level. These competencies included using flexible rules, gaining and keeping pupil attention, teaching the class as a unit, and encouraging pupil-initiated questions. Although Borich did not do so, it would be possible to specify the teaching skills that are basic to these competencies, and state them as objectives to be acquired through training.

In all of these examples--whether quantitative or qualitative criteria were applied and whether or not skills were validated against pupil product standards--the focus was on teacher processes. These processes were assessed without immediate reference to pupil behavior or achievement.

Interactive Process Criteria

Another, more complex way of defining criteria is in terms of the interactive characteristics of teaching skills. Such characteristics as the responsiveness or adaptiveness with which a teacher interacts with pupils are examples. Criteria of this type might be applied to a teacher's use of questions: Are those questions appropriate in difficulty to the conceptual maturity of pupils? Are they relevant to the content of pupil responses?

An example of the application of interactive criteria can be found in a study by Moore and his co-investigators (1978). In

this study, feedback gathered from observing teachers with their classes was used to encourage change in teaching performance. The investigators were concerned with several interactive behaviors: attending to pupils who needed attention; trying varied reactions to pupils who were not paying attention; varying the content, form, and difficulty level of questions asked of pupils who had previously answered incorrectly. As a result of feedback on each type of interaction, teachers in this study significantly changed their behavior in the desired direction in each of the three categories. Increases in pupil attention and in correct answers to questions also were evident. Although these results are interesting in themselves, it is important to note here that the interactive use of teaching skills was successfully modified and assessed: The adaptiveness and variability of teacher behaviors, in reaction to pupil responses, were significantly changed.

Thus far, we have been concerned with the responsiveness or adaptiveness of teaching skills contingent upon a teacher's perception of a pupil's understanding, attitude, or interest. A teacher's questions or instructions may also be adapted to information about the achievement level, socioeconomic status, and perhaps sociometric status of different pupils. The first two variables, in particular, have been found to interact with teaching behavior in influencing pupil achievement (Borich 1977). Thus, objective information about pupils may be as important as the subjective impressions of teachers in determining the timing, form, and content of teacher's responses.

Implications For Research on Teaching

The preceding comments on interactive processes and criteria provide a point of departure for considering the future of research on teacher training. As we have seen, substantial evidence supports the idea that teaching skills can be learned through a number of well-defined processes. Investigators also are beginning to identify the factors that influence the use and retention of teaching skills. Evidence is most wanting on the acquisition of teaching skills that are genuinely interactive, that reflect an awareness of and adjustment to pupil behavior. We have little direct evidence on ways of acquiring more complex skills.

We can best hypothesize that the varied processes described for learning less complex skills might be applicable also to the learning of more complex skills. The few training studies that have addressed complex, interactive skills tend to confirm the effectiveness of these processes. For example, in the study by Moore and his co-investigators, the primary means of skill development was systematic feedback in the form of observational data reported to teachers on their selective attention to pupils; variation in their attempts to enlist pupil attention; and the appropriateness of changes in the form, content, and difficulty

of their questions. Thus, an hypothesis that providing feedback can be effective in the acquisition of interactive skills is partially substantiated. The same may be found for learning through observation, reinforcement, and other processes.

It is likely, however, that the acquisition of concepts that describe and interpret pupil behavior is a generally necessary part of developing interactive teaching skills. Relevant concepts about pupil behavior are the basis for interpreting pupil behavior, and interpretation, in turn, is the basis for adaptive, responsive teacher behavior. To return to the Moore study, it is apparent that the teachers in this study had to be able to interpret or categorize pupil responses to questions as correct or incorrect, and similarly to recognize when the content of incorrect responses reflected a lack of basic information. Without such categories, the teachers would have been unable to vary the form or level or to select the content of their questions appropriately.

Can teachers learn effectively to interpret or categorize pupil behavior in an interactive setting? The evidence on this question is clearly affirmative. As an example, Ingersoll and Gliessman (1980) have shown that preservice teachers can learn to "monitor" classroom behavior shown in a filmed situation in terms of concepts that describe the task and group focus of pupils. By acquiring and practicing the use of a set of relatively simple categories, the trainees increased the accuracy with which they could rapidly classify pupil behavior. Such skillfulness in monitoring, in turn, is essential to controlling pupil behavior with the timing, sensitivity, and accuracy that contributes to a smoothly running classroom.

To summarize, the basis for skillful teaching in an interactive sense lies in the interpretive abilities of teachers. The act of interpreting pupil behavior and the act of instructing pupils should be viewed as close counterparts, the first setting the boundaries of the instructional skills to be used, and the second, in a sense, validating the interpretation that has been made. To identify ways of learning to teach effectively in an interactive sense is a primary task for future research on teacher training.

Summary

Teaching skills can be acquired or modified through various processes: observation, concept acquisition, practice, and feedback. Direct evidence from laboratory and classroom settings shows that these processes can significantly influence teaching performance. However, evidence does not indicate that combining these processes into a single training methodology provides any advantage for teaching. Teaching also may be influenced by providing information about teaching skills, inducing cognitive conflict, and arranging for selective reinforcement, although direct evidence on the effects of these processes is less substantial.

Although teaching skills may have been acquired or modified, their use and retention cannot simply be assumed. Evidence indicates rather that the complexity of a skill, its acceptance philosophically, its utility in terms of student learning, and supervisory support that it receives all influence the extent to which a teaching skill is adopted and used. Retention of teaching skills over an extended period of time has been demonstrated, although the conditions that lead to such retention have not been clearly identified.

The effects of the processes described are clear, but they are somewhat limited because incidence or frequency of occurrence of relatively simple teaching skills has almost uniformly been the criterion for learning. To extend and refine the knowledge about these processes will require a refining of criteria to include both qualitative standards and more complex definitions of teaching skill. It is likely that stating criteria in terms of interactive teacher-pupil processes is most critical to further research and development in learning how to teach.

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